

# Notes 11/18 - Graphing Lines and Transformations

Slope-intercept form  $f(x)$   
 $y = Mx + b$   
slope  $\swarrow$   $\searrow$  y-intercept when  $x=0$

$$\frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\Delta y}{\Delta x}$$

- When graphing
  1. begin at your  $b$ -value  $(0, b)$  - y-intercept
  2. Move from that point according to your slope ( $M$ )

## Transformations

→ Compare to the parent function  $y = x$   
 $\downarrow$   
Slope = 1  $b = 0$

1. Slope → Steeper or flatter AND reflect

- If  $0 < |M| < 1$ , the line is flatter

Ex:  $\frac{1}{4}$ ,  $-\frac{2}{3}$ ,  $0.8$

$|M|$  means to ignore the negative when deciding if it's steeper or flatter

- If  $|M| > 1$ , the line is steeper

Ex:  $2$ ,  $-5$ ,  $\frac{7}{2}$

- If  $M < 0$  (negative), the line is a reflection of  $y = x$  ↗

2. y-intercept → vertical translation (shift up or down)

- If  $b > 0$ , shift up

- If  $b < 0$ , shift down



How are the following transformations of  $y=x$ ?

Ex 1:  $y = \frac{4}{5}x + 2$

flatter

↳ shift up 2 units

Ex 2:  $y = 5x - 3$

steeper

↳ shift down 3 units

Ex 3:  $f(x) = -\frac{1}{3}x + 7$

reflected

flatter

↳ shift up 7

Ex 4:  $f(x) = -\frac{5}{4}x - 1$

reflected

steeper

↳ shift down 1 unit